



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/058,337	01/30/2002	Kanna Aoki	1794-0148P	6134
2292	7590	04/13/2004	EXAMINER	
BIRCH STEWART KOLASCH & BIRCH PO BOX 747 FALLS CHURCH, VA 22040-0747			PERT, EVAN T	
			ART UNIT	PAPER NUMBER
			2829	
DATE MAILED: 04/13/2004				

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/058,337

Applicant(s)

AOKI ET AL. 

Examiner

Evan Pert

Art Unit

2829

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 10 February 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) 5-23 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 0204
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Claim Objections***

1. Claims 1-3 are objected to because of improper grammar to clearly describe the structure being claimed in a United States patent:

In claims 1-3, the phrase "so as to obtain a periodic structure in response to wavelengths of light " is used to mean "so as to obtain a periodic structure having a periodicity on the order of wavelengths of light" wherein the "periodic structure" is a fixed structure having fixed periodicity; that is, the periodicity does not "respond" to wavelengths. One could say the choice of periodicity is made in response to a desire for a particular periodicity, but the "periodic structure" is not grammatically properly "obtained in response to light"

Applicant should re-phrase the claim language for proper grammar such that the "periodic structure" is not "obtained in response to wavelengths of light"; rather, a design engineer, for example, "responds" to a desire or need by choosing parameters of periodicity to be on the order of wavelengths of light.

While the examiner deems this item as an informality arising as an artifact of translation into English, appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-4 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Applicant's process limitations for claiming a product are not clearly directed to the product as required [see MPEP 2173.05(p)]:

In the instant case, applicant's use of "*to be laminated*" and "*to be located*" in the claims introduces ambiguity because the plates of the claimed three-dimensional photonic crystal are either laminated or they are not, and the positioning members are located in the through holes or they are not. The use of "*to be*" introduces ambiguity rather than a defining structural limitation of the claimed product. For purposes of examination, the "*to be*" of the claims is taken as being equivalent to "*is*", "*are*" or "*and*", as grammatically appropriate.

In claim 1, "...are rotated at 90° to each other *to laminate* them" implies a process function or action of '*in order to*' laminate them, which is confusing. For purposes of examination, the limitation of 90° rotation is really just a relative positioning of "plates" that are "laminated" in a stack.

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Claim 1 is rejected under 35 U.S.C. 102(a) as being anticipated by Noda (CA 2330866 A1). Applicant defines "wafer fusion" to be a kind of "laminating" [p. 2, line 21]. Therefore, Noda teaches a three-dimensional photonic crystal formed from a laminated stack of two-dimensional photonic crystal plates ( $10_2$  and  $10_1$ ) wherein the striped form of periodic structure aligned in one plate is rotated  $90^\circ$  with respect to the stripes of the periodic structure of a second plate.

***Allowable Subject Matter***

4. Claims 2-3 would be allowable if rewritten or amended to overcome the rejections under 35 U.S.C. 112, second paragraph, and objections set forth in this Office action.

5. Claim 4 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

6. The following is a statement of reasons for the indication of allowable subject matter: The prior art does not disclose a three-dimensional photonic crystal in the form of a laminated stack of two-dimensional photonic crystal plates wherein the plates are provided with positioning members in through holes, preferably spherical members in circular holes.

***Response to Arguments***

7. Applicant's arguments with respect to claims 1-4 have been considered but are moot in view of the new ground(s) of rejection.

Art Unit: 2829

8. The affidavit filed on February 10, 2004 under 37 CFR 1.131 is sufficient to overcome the Aoki et al. reference.

**Conclusion**


9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US 2001/0026857 A1 is cited for disclosing three—dimensional photonic crystal fabrication by stacking two-dimensional photonic crystal plates, but does not disclose "positioning members" located in "through holes," preferably spherical members in circular holes.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Evan Pert whose telephone number is 703-306-5689. The examiner can normally be reached on M-F (7:30AM-3:30 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kamand Cuneo can be reached on 703-308-1233.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

ETP  
March 26, 2004

  
**EVAN PERT**  
**PRIMARY EXAMINER**